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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

FENG CHEN

Serial No. 10/661,019 (TI-35765)

Filed September 12, 2003

For: SIGMA-DELTA MODULATOR WITH PASSIVE BNADPASS LOOP FILTER

Art Unit 2819

Examiner Peguy Jean Pierre

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Jay M. Cantor, Reg. No. 19,906

Sir:

**BRIEF ON APPEAL**

**REAL PARTY IN INTEREST**

The real party in interest is Texas Instruments Incorporated, a Delaware corporation with offices at 7839 Churchill Way, Dallas, Texas 75251.

**RELATED APPEALS AND INTERFERENCES**

There are no known related appeals and/or interferences.

### **STATUS OF CLAIMS**

This is an appeal of claims 1, 2, 7, 8 and 19, all of the rejected claims. Claims 13 to 18 and 20 have been allowed and claims 3 to 6 and 9 to 12 have been objected to but have been indicated to be allowable. No fee is believed to be due because a Brief on Appeal was previously filed and the rejection was withdrawn. However, should a fee be due, please charge any costs to Deposit Account No. 20-0668.

### **STATUS OF AMENDMENTS**

An amendment was not filed after final rejection.

### **SUMMARY OF CLAIMED SUBJECT MATTER**

The claimed invention relates to a method and structure for digitizing a signal which includes the steps or structure for sampling and holding an analog signal to yield a sampled signal, the analog signal comprising information(12), filtering the sampled signal at a passive filter circuit to yield a filtered signal, the passive filter circuit comprising at least one passive element, the filtered signal characterized by a bandpass response (14 and page 3, lines 10 to 13) and quantizing the filtered signal to yield a digital signal, the digital signal corresponding to the analog signal, the digital signal comprising the information (16). The analog signal can include an intermediate frequency signal.

### **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

The sole issue is whether claims 1, 2, 7, 8 and 19 are anticipated by Khoury et al. (U.S. 6,121,910).

## ARGUMENT

Claims 1, 2, 7, 8 and 19 were rejected under 35 U.S.C.102(b) as being anticipated by Khoury et al. (U.S. 6,121,910). The rejection is without merit.

It is initially noted that the claims have been rejected under section 102 and accordingly it is imperative that each and every claimed feature and each and every function of each and every claimed feature be found in a single reference to uphold such a rejection.. This has not been done as will be demonstrated hereinbelow.

Claim 1 requires, among other features, the step of sampling and holding an analog signal to yield a sampled signal, the analog signal comprising information. It is not apparent from Khoury et al. that the analog is sampled and held to yield a sampled signal as required by claim 1. The input of Khoury et al. in both Figs. 1 and 7 is an analog input signal to a summer. In fact, in the instance where a passive filter can be used in Khoury et al., it is specifically stated that no sample and hold circuit is utilized at column 6, lines 39 to 49.

Claim 1 further requires the step of filtering the sampled signal at a passive filter circuit to yield a filtered signal, the passive filter circuit comprising at least one passive element, the filtered signal characterized by a bandpass response. While the filter 704 of Khoury et al. can be a passive filter, the input thereto is not a sampled signal as claimed. Furthermore, Fig. 7 is stated to be an entirely different embodiment of the invention, so there is no teaching or suggestion to place to filter 704 of Fig. 7 into Fig.1. This is confirmed at column 4 in the definition of Fig. 7. It is again respectfully submitted that in Khoury et al, nothing is stated as to the circuitry of filter 104 other than that it can be a bandpass filter. The claim calls for a passive filter. The use of a passive filter provides for lower power consumption and higher resolution than is available with the prior art as known at the time of filing of subject application.

As stated in the title of the invention as well as in the specification, a major purpose of the present invention is to provide a sigma delta modulator with a passive bandpass filter and, more specifically, using a passive bandpass loop filter. This type of circuitry provides a substantial improvement in power consumption and may provide improvements of other types wherein the prior art sigma delta modulation, which utilizes active elements, may be unsatisfactory.

Claim 2 depends from claim 1 and therefore defines patentably over the applied references for at least the reasons presented above with reference to claim 1.

In addition, claim 2 further limits claim 1 by requiring that the analog signal comprise an intermediate frequency signal. No such limitation is found in Khoury et al. either alone or in the combination as claimed and no comments have been made in the final rejection relative to this claim other than that it is rejected.

Claim 7 requires, among other features, those features discussed above with reference to claim 1. Accordingly the arguments presented above with reference to claim 1 apply as well to claim 7 and are incorporated by reference.

Claim 7 further requires a comparator coupled to the passive filter circuit and operable to quantize the filtered signal to yield a digital signal, the digital signal corresponding to the analog signal, the digital signal comprising the information.

The arguments further presented in connection with claim 1 apply as well to this claim other than the fact that claim 7 is written in structure rather than method format.

Claim 8 depends from claim 7 and therefore defines patentably over the applied references for at least the reasons presented above with reference to claim 7.

Claim 8 further limits claim 7 by requiring that the analog signal comprise an intermediate frequency signal. No such limitation is found in or Khoury et al. either alone or in the combination as claimed and no comments have been made in the final rejection relative to this claim other than that it is rejected

Claim 19 requires, among other features, means for sampling and holding an analog signal to yield a sampled signal, the analog signal comprising information. It is not apparent from Khoury et al. that there is a sample/hold circuit and no comments have been made in the final rejection relative to this claim other than that it is rejected.

Claim 19 further requires a passive filter circuit having a passive filter coupled to the sample-hold circuit and operable to filter the sampled signal to yield a filtered signal, the passive filter circuit comprising at least one passive element, the filtered signal characterized by a bandpass response. The discussion with reference to claim 1 is apropos and incorporated by reference.

### **CONCLUSIONS**

For the reasons stated above, reversal of the final rejection and allowance of the claims on appeal is requested that justice be done in the premises.

Respectfully submitted,



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## **CLAIMS APPENDIX**

The claims on appeal read as follows:

1. A method for digitizing a signal, comprising:

sampling and holding an analog signal to yield a sampled signal, the analog signal comprising information;

filtering the sampled signal at a passive filter circuit to yield a filtered signal, the passive filter circuit comprising at least one passive element, the filtered signal characterized by a bandpass response; and

quantizing the filtered signal to yield a digital signal, the digital signal corresponding to the analog signal, the digital signal comprising the information.

2. The method of Claim 1, wherein the analog signal comprises an intermediate frequency signal.

7. A sigma-delta modulator, comprising:

a sample-and-hold circuit operable to sample and hold an analog signal to yield a sampled signal, the analog signal comprising information;

a passive filter circuit coupled to the sample-and-hold circuit and operable to filter the sampled signal to yield a filtered signal, the passive filter circuit comprising at least one passive element, the filtered signal characterized by a bandpass response; and

a comparator coupled to the passive filter circuit and operable to quantize the filtered signal to yield a digital signal, the digital signal corresponding to the analog signal, the digital signal comprising the information.

8. The modulator of Claim 7, wherein the analog signal comprises an intermediate frequency signal.

19. A sigma-delta modulator, comprising:

means for sampling and holding an analog signal to yield a sampled signal, the analog signal comprising information;

means for filtering the sampled signal with a passive filter circuit to yield a filtered signal, the passive filter circuit comprising at least one passive element, the filtered signal characterized by a bandpass response; and

means for quantizing the filtered signal to yield a digital signal, the digital signal corresponding to the analog signal, the digital signal comprising the information.

**RELATED PROCEEDING APPENDIX**

Not applicable.